ABSTRACT

METHOD AND APPARATUS FOR SYMMETRICAL DMT X-DSL COMMUNICATIONS

The current invention provides a method and apparatus for communicating two or more channels of DMT modulated data within the same frequency spectrum, thus providing symmetrical bandwidth for upstream and downstream communication across a communication medium. The apparatus may be used for dual channel or multi-channel communications. The method may be implemented on a physical modem or a logical modem with the logical modem including a digital signal processor (DSP) coupled to an analog front end (AFE). The communication medium may include: wired, wireless and optical. Orthogonality in either the time or frequency domains is injected into the individual symbols associated with each DMT tone set or between successive tone sets using a unique code, e.g. Walsh code, assigned to each transmitted channel. The mutual orthogonality of these codes allows two or more channels to be supported in either an upstream or downstream direction using a DMT line code, in connection with any of the various X-DSL protocols including: G.Lite, ADSL, VDSL, SDSL, MDSL, RADSL, HDSL, etc. The present invention provides a signal processing architecture that supports scalability of CO/DLC/ONU resources, and allows a significantly more flexible hardware response to the evolving X-DSL standards without over committing of hardware resources. As standards evolve hardware may be reconfigured to support the new standards.